

WHAT IS CLAIMED IS:

1. An article of jewelry constructed at least partially of a amorphous alloy having a bulk-solidified amorphous phase, wherein the amorphous alloy contains a precious metal selected from the group consisting of Pd, Pt and Au, and wherein the amorphous alloy has a precious metal
5 content of at least 75% by weight.

2. The article as described in claim 1, wherein the amorphous alloy has a hardness of 400 Vickers or more.

10 3. The article as described in claim 1, wherein the amorphous alloy has a yield-strength of 1.2 GPa more.

4. The article as described in claim 1, wherein the amorphous alloy has an elastic strain limit of 1.5 % more.

15 5. The article as described in claim 1, wherein the amorphous alloy has an elastic strain limit of 1.8 % more.

20 6. The article as described in claim 1, wherein the amorphous alloy has a thermal conductivity of less than 20 W/mK.

7. The article as described in claim 1, wherein the amorphous alloy has a critical cooling rate less than 1000 °C/second.

25 8. The article as described in claim 1, wherein the amorphous alloy has a critical cooling rate less than 100 °C/second.

9. The article as described in claim 1, wherein the amorphous alloy has a critical cooling rate less than 10 °C/second.

30 10. The article as described in claim 1, wherein the amorphous alloy has a delta T of 60 °C or more.

11. The article as described in claim 1, wherein the amorphous alloy has a delta T of 90 °C or more.

12. The article as described in claim 1, wherein the amorphous alloy has a reduced
5 glass transition temperature, T_g, of 0.6 or more.

13. The article as described in claim 1, wherein the amorphous alloy has a glass transition temperature, T_g, of 300° C or less.

10 14. The article as described in claim 1, wherein the amorphous alloy has a glass transition temperature, T_g, between 200 °C and 250 °C.

15 15. The article as described in claim 1, wherein the amorphous alloy has a melting temperature, T_m, of less than 700 °C.

16. The article as described in claim 1, wherein the amorphous alloy has a melting temperature, T_m, of less than 600 °C.

20 17. The article as described in claim 1, wherein a portion of the amorphous alloy has a thickness of more than 0.5 mm.

18. The article as described in claim 1, wherein a portion of the amorphous alloy has a thickness of more than 5 mm.

25 19. The article as described in claim 1, wherein the precious metal is Au, and wherein the Au comprises at least 58.3 percent weight of the amorphous alloy.

20. The article as described in claim 1, wherein the precious metal content of the amorphous alloy is substantially Pt.

30 21. The article as described in claim 1, wherein the precious metals comprise at least 85 percent weight of the amorphous alloy.

22. The article as described in claim 1, wherein the precious metal is substantially Pt, and wherein the Pt comprises at least 85 percent weight of the amorphous alloy.

23. The article as described in claim 1, wherein the article is an investment casting of the precious metal-based bulk-solidifying amorphous alloy.

24. The article as described in claim 1, wherein the article is selected from the group consisting of an earring, bracelet, necklace, watch-case, frame, enclosure for an electronic accessory, pen, and frame for glasses.

25. The article as described in claim 1, wherein the metallic part of the article is made of the precious metal-base alloy in bulk-solidified amorphous phase.

26. The article as described in claim 1, wherein the amorphous alloy has substantially no Nickel content.

27. A method of manufacturing an article of jewelry comprising:
providing a molten piece of bulk-solidifying amorphous alloy wherein the amorphous alloy contains a precious metal selected from the group consisting of Pd, Pt and Au, and wherein the amorphous alloy has a precious metal content of at least 75% by weight;
providing a mold having the form of a desired jewelry component; and
casting the molten amorphous alloy into a near-to-net shape jewelry component.

28. The method as described in claim 27, wherein the casting comprises investment-cast.

29. The method as described in claim 27, wherein the mold has a surface layer of fused silica.

30. The method as described in claim 27, wherein the molten piece of precious-metal base bulk-solidifying amorphous alloy is cast over at least one gemstone.

31. The method as described in claim 27, wherein the casting comprises one of either metallic mold casting or die-casting.

5 32. The method as described in claim 27, wherein the casting is conducted under one of either a partial vacuum or full vacuum.

33. The method as described in claim 27, further comprising feeding the molten piece of precious-metal base bulk-solidifying amorphous alloy into the mold by applying an external pressure.

10

34. A method of manufacturing an article of jewelry comprising:
providing a solid feed-stock of precious-metal base bulk-solidifying amorphous alloy, wherein the amorphous alloy contains a precious metal selected from the group consisting of Pd, Pt and Au, and wherein the amorphous alloy has a precious metal content of at least 75% by weight;

15

heating the amorphous alloy into a super-cooled viscous liquid regime; and
molding the heated amorphous alloy into a near-to-net shape jewelry component.